

LISTING OF THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

Claims 1-76 (Cancelled)

--77. (Currently Pending) A wafer scale structure for packaging integrated circuits, comprising:

a monolithic substrate wafer of semiconductor material that is subdivided into a plurality of integrated circuit die regions, each integrated circuit die region including an integrated circuit structure formed in said die region, the integrated circuits formed in the integrated circuit die regions being substantially identical, each of the integrated circuit structures including a plurality of spaced-apart conductive die bond pads arranged in a pattern;

a unitary, substantially planar prefabricated solid glass sheet having substantially the same size as the monolithic substrate wafer and having a plurality of prefabricated holes formed therethrough from an upper surface of the solid glass sheet to a lower surface of the solid glass sheet, the upper surface of the solid glass sheet being substantially coplanar with the lower surface of the solid glass sheet, the prefabricated holes being formed to provide a plurality of identical hole patterns, each hole pattern being identical to a corresponding pattern of die bond pads of an integrated circuit structure formed in the substrate wafer, each hole formed in the solid glass sheet having an associated conductive solder ball bond pad formed on the upper surface of the solid glass sheet in proximity to said prefabricated hole;

adhesive material disposed between the upper surface of the substrate wafer and the lower surface of the solid glass sheet to affix the solid glass sheet to the wafer substrate such that each pattern of prefabricated holes in the solid glass sheet is aligned with an associated die bond pad pattern included in an associated integrated circuit structure;

for each conductive solder ball bond pad formed on the upper surface of the solid glass sheet, a region of conductive material formed in electrical contact with said conductive solder ball die bond pad and extending through the associated prefabricated hole in the solid glass sheet and through the adhesive material and in electrical contact with the die bond pad associated with said prefabricated hole; and

for each conductive solder ball bond pad formed on the upper surface of the solid glass sheet, a conductive solder ball formed on said conductive solder ball bond pad to thereby provide an electrical connection between said conductive solder ball and an associated die bond pad.

78. (Currently Pending) A wafer scale structure as in claim 77, and wherein the solid glass sheet has a coefficient of thermal expansion that is substantially the same as the coefficient of thermal expansion of the substrate wafer.

79. (Currently Pending) A wafer scale structure as in claim 77, and wherein the substrate wafer comprises crystalline silicon.

80. (Currently Pending) A wafer scale structure as in claim 77, and wherein the conductive solder ball bond pads comprise a metal selected from the group consisting of aluminum, nickel, gold and copper.

81. (Currently Pending) A wafer scale structure as in claim 77, and wherein the region of conductive material comprises a metal selected from the group consisting of aluminum and gold.

82. (Currently Pending) A wafer scale structure as in claim 77, and wherein the region of conductive material comprises a conductive polymer.

83. (Currently Pending) A wafer scale structure as in claim 77, and further comprising:

a non-conductive mask formed on the upper surface of the solid glass sheet and patterned to facilitate formation of the conductive solder balls on the conductive solder ball bond pads.

84. (Currently Pending) A wafer scale structure for packaging integrated circuits, comprising:

a semiconductor substrate wafer that includes a plurality of substantially identical semiconductor integrated circuit structures formed therein, each integrated circuit structure including a plurality of conductive die bond pads formed on an upper surface of said integrated circuit structure and arranged in a pattern;

a unitary, substantially planar prefabricated solid glass sheet having substantially the same size as the semiconductor substrate wafer and having a plurality of prefabricated holes formed therethrough from an upper surface of the solid glass sheet to a lower surface of the solid glass sheet, the upper surface of the solid glass sheet being substantially coplanar with the lower surface of the solid glass sheet, the prefabricated holes being formed to provide a plurality of identical hole patterns, each hole pattern being identical to a corresponding pattern of die bond pads of an integrated circuit structure formed in the semiconductor substrate wafer, each prefabricated hole formed in the solid glass sheet having an associated conductive solder ball bond pad formed on the upper surface of the solid glass sheet in proximity to said prefabricated hole, the conductive solder ball bond pad including a portion that extends into said prefabricated hole to cover sidewalls of said prefabricated hole;

adhesive material disposed between the upper surface of the wafer substrate and the lower surface of the solid glass sheet to affix the solid glass sheet to the wafer substrate such that each pattern of prefabricated holes in the solid glass sheet is aligned with an associated conductive die bond pad pattern formed on the integrated circuit die;

for each conductive solder ball band pad, a conductive plug formed in the prefabricated hole in the solid glass sheet associated with said conductive solder ball bond pad and in electrical contact with the portion of said conductive solder ball bond

pad extending into said prefabricated hole, the conductive plug extending through the adhesive material to be in electrical contact with the conductive die bond pad associated with said prefabricated hole; and

for each conductive solder ball bond pad, a conductive solder ball formed thereon to thereby provide an electrical connection between said conductive solder ball and an associated conductive die bond pad.

85. (Currently Pending) A wafer scale structure for packaging integrated circuits, comprising:

a semiconductor substrate wafer that includes a plurality of substantially identical integrated circuit structures formed therein, each integrated circuit structure including a plurality of conductive die bond pads formed on an upper surface of said integrated circuit structure and arranged in a pattern;

a unitary, substantially planar prefabricated solid glass sheet having substantially the same size as the semiconductor substrate wafer and having a plurality of prefabricated holes formed therethrough from an upper surface of the solid glass sheet to a lower surface of the solid glass sheet, the upper surface of the solid glass sheet being substantially coplanar with the lower surface of the solid glass sheet, the prefabricated holes being formed to provide a plurality of identical hole patterns, each hole pattern being identical to a corresponding pattern of die bond pads of an integrated circuit structure formed in the semiconductor substrate, each prefabricated hole formed in the solid glass sheet having a conductive solder ball bond pad structure associated therewith, the conductive solder ball bond pad structure including a first portion formed on the upper surface of the solid glass sheet in proximity to said prefabricated hole and a second portion that extends through the associated prefabricated hole and through the adhesive material to be in electrical contact with the die bond pad associated with said prefabricated hole;

each conductive solder ball bond pad structure having a conductive solder ball formed on the first portion of said conductive solder ball bond pad structure to thereby provide an electrical connection between said conductive solder ball and an associated conductive die bond pad.